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protozoa. And as a result of this separation, it is possible to eliminate fungi from experiments involving the effect of protozoa upon bacterial activity, by making a subculture from the fungi-free solution of bacteria and protozoa (in the cavity of the agar plate).

Some studies on the comparative value of different media for the development of soil protozoa, somewhat after the manner of Cunningham and Löhnis<sup>9</sup> and others, were carried out with hay infusion, with and without the addition of .5 per cent. egg albumen (Goodey), peptone, dried blood, soil extract (Löhnis), horse, cow and chicken manures (Martin) and egg albumen. The above media were employed in dilutions of .5 per cent., 1 per cent., 3 per cent., 5 per cent. and 10 per cent.

A condensed table<sup>10</sup> of maximum numbers (counts made on five succeeding days by means of the Blutkörperzählapparat previously described) is given below:

Days	Large Ciliates	Large Flagellates	Small Ciliates	Small Flagellates
1	8,520 in soil ex. 800 cc.	840 in 10 % hay	4,255 in 5 % D. B.	28,750 in 5 % D. B.
2	63,800 in horse .5 %	709 in 5 % egg albumen	9,210 in 3 % chicken	282,000 in 5 % horse
3	319,010 in 10 % hay	10,625 in 10 % hay	208,000 in 3 % chicken	636,500 in soil ex. 1,000 cc.
4	708,000 in 10 % hay	7,435 in 5 % cow	379,000 in 3 % egg	478,000 in 1 % horse
5	1,410,000 in 10 % hay and egg	310,000 in 5 % cow	804,000 in 3 % egg	1,878,000 in 3 % hay and egg

### Summary

1. Ten per cent. hay infusion proved to be the most favorable medium for the development of large numbers of small flagellates, as well as small and large ciliates. Hay infusion in various concentrations, with and without the addition of egg albumen, proved to be well adapted to the development of the organisms. Hay infusion plus .5 per cent. egg albumen

<sup>9</sup> Cunningham and Löhnis, *Centr. f. Bakt.*, II., 39 (1914), 596.

<sup>10</sup> Kopeloff, Lint and Coleman, *Am. Mic. Soc.*, 34, No. 2 (1915), 149, *Jour. Agr. Res.*, 4, No. 6 (1915).

proved superior to all other media for the development of ciliates.

2. Soil extract is an excellent medium, though somewhat inferior to hay infusion plus .5 per cent. egg albumen and with the soil used in this experiment lower concentrations than those recommended by Löhnis, developed protozoa in a shorter period of time.

3. Three per cent. chicken manure is an excellent medium for the development of small ciliates.

4. The numbers and species of protozoa which can be obtained from a given soil are largely dependent upon the media employed, time of incubation, as well as the kind of soil used.

5. In general the order of appearance of protozoa was as follows: small flagellates, small ciliates, large flagellates (if appearing at all) and finally large ciliates. This confirms Cunningham and Löhnis's observations.

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NEW BRUNSWICK, N. J.,  
February 25, 1915

### SOCIETIES AND ACADEMIES

#### THE BOTANICAL SOCIETY OF WASHINGTON

The Botanical Society of Washington entertained at an informal dinner at the Cosmos Club, on Thursday evening, July 22, 1915, Dr. F. Kølpin Ravn, of Denmark, Dr. Otto Appel, of Germany, and Dr. Gentaro Yamada, of Japan. Mr. M. A. Carleton welcomed the guests, each of whom responded.

Dr. H. B. Humphrey commented on the services rendered to cereal pathology by Dr. Ravn's travel and studies in the United States this season.

Dr. W. A. Orton gave a full account of the travel of Dr. Appel and his investigations of the potato diseases in this country during the past year.

Dr. E. F. Smith emphasized the importance of wide travel and experience to botanical investigators.

Dr. C. L. Shear spoke on international phytopathology, and expressed a hope that within a short time there may be organized an international society of plant pathologists.

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